

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 5, 7-13, 15-21, and 23 are pending in the present application, Claims 7, 15, and 23 having been amended. Support for the amendments to Claims 7, 15, and 23 is found, for example, at page 1, lines 14-15 and page 7, line 8 of the originally filed specification. Applicants respectfully submit that no new matter is added.

In the Office Action, Claims 1, 5, and 7 were rejected under 35 U.S.C. §102(b) as anticipated by Baldauf et al. (U.S. Patent No. 2002/0119352, hereinafter Baldauf); Claims 8, 9, 15-17, and 23 were rejected under 35 U.S.C. §102(e) as anticipated by Von Andrian et al. (U.S. Patent No. 6,977,118, hereinafter Von Andrian); Claims 11-13 and 19-21 were rejected under 35 U.S.C. §103(a) as unpatentable over Von Andrian in view of Baldauf; and Claims 10 and 18 were rejected under 35 U.S.C. §103(a) as unpatentable over Von Andrian in view of Tsuki et al. (U.S. Patent No. 4,629,664, hereinafter Tsuki).

In a non-limiting embodiment of the invention defined by Claim 1, any fluid applied as fuel for the fuel cell system is kept in a liquid phase throughout the system (i.e., from the fuel tank through the fuel supply path, which includes heat exchangers intervening in the fuel supply path). The liquid fuel is used to generate electricity in the fuel cell. As explained in the specification for a non-limiting embodiment of the claimed invention, the fuel cell system includes a liquid fuel cell. For example, the specification recites “The present invention relates to a liquid fuel cell..., directly employing a liquid organic compound, such as methanol, as fuel so as to generate electric power.”¹ The specification also recites “The MEA 7 with packings 9A and 9B are put between a separator 13 having a flow path 11 for flowing methanol aqueous solution as fuel...”²

¹ Specification, page 1, lines 11-16 (emphasis added).

² Specification, page 7, lines 15-18 (emphasis added).

Thus, heat exchangers in the non-limiting embodiments of the claimed invention do not intensively carry out evaporation or vaporization of the liquid fuel.

With respect to the rejection of Claim 1 as anticipated by Baldauf, Applicants respectfully traverse this ground of rejection. Claim 1 recites:

A fuel cell system comprising:

a direct organic *liquid feed fuel cell* having an anode, a cathode and an electrolyte membrane put therebetween;

a fuel supply unit supplying *liquid fuel* to the anode;

an air supply unit supplying air to the cathode;
and

a heat exchanger exchanging heat between *the liquid fuel* supplied by the fuel supply unit to the anode and an exhaust exhausted from the direct organic *liquid feed fuel cell*, wherein the exhaust is exhausted from the anode or both the cathode and the anode.

Applicants respectfully submit that Baldauf does not disclose or suggest the subject matter of Claim 1.

The fuel cell disclosed in Baldauf uses gaseous fuel, and not a liquid fuel. As shown in Fig. 1 of Baldauf, methanol 8 travels through mixer 5, pump 7, and evaporator 2 before traveling to the fuel cell stack 1. The evaporator converts the liquid methanol into a gas, and it is this gas the fuel cell stack uses. Baldauf recites "...and the fuel cell mixture is evaporated before it enters the stack 1."³ Stack 1 of Baldauf is not a "direct organic liquid feed fuel cell" as the stack of Baldauf uses a gas and not a liquid. Thus, Baldauf does not disclose or suggest the claimed "a direct organic liquid feed fuel cell."

Furthermore, dependent Claim 7 is amended to indicate that the direct organic liquid feed fuel cell is a direct *liquid* methanol fuel cell. Claim 7 cannot be interpreted to refer to

³ Baldauf, paragraph [0072].

methanol gas. Thus, the methanol gas of Baldauf does not equate to the claimed “direct organic liquid feed fuel cell” or the claimed “direct liquid methanol fuel cell.”

Furthermore, Baldauf does not disclose or suggest the claimed “a heat exchanger exchanging heat between the liquid fuel supplied by the fuel supply unit to the anode and an exhaust exhausted from the direct organic liquid feed fuel cell, wherein the exhaust is exhausted from the anode or both the cathode and the anode.” The outstanding Office Action equates Baldauf’s evaporator 2 to the claimed heat exchanger. However, evaporator 2 does not exchange heat between the liquid fuel supplied by the fuel supply unit to the anode and an exhaust exhausted *from the direct organic liquid feed fuel cell*. The connection denoted by line 12 from stack 1 to evaporator 2 in Fig. 1 of Baldauf is not an exhaust *from the direct organic liquid feed fuel cell*. As explained above, stack 1 is not a direct organic liquid feed fuel cell.

In view of the above-noted distinctions, Applicants respectfully submit that Claim 1 (and Claims 2-5 and 7 dependent thereon) patentably distinguish over Baldauf.

Applicants respectfully traverse the rejection of Claim 8 as being anticipated by Von Andrian. Claim 8 recites, *inter alia*, “a heat exchanger connected to the mixing container so as to exchange heat between ambient air and the liquid mixture in the mixing container.” Von Andrian does not disclose or suggest this element of Claim 8.

Page 4 of the outstanding Office Action appears to take the position that heat exchanger WT3 of Von Andrian equates to the claimed “heat exchanger.” Applicants respectfully traverse this position because the heat exchanger WT3 of Von Andrian does not exchange heat between ambient air and the liquid mixture. Particularly, col. 3, lines 41-45 of Von Andrian recites “[t]he fuel mixture passes into a circulating tank and then [sic] raised to operating temperature in the heat exchanger WT3. The amount of heat required for that purpose is supplied by the waste heat downstream of the catalytic burner.” Thus, heat exchanger WT3 of Von Andrian exchanges heat between an output of a catalytic burner and

the liquid mixture. The heat exchanger WT3 of Von Andrian does not use ambient air as described in Claim 8.

Thus, Von Andrian does not disclose or suggest the claimed “a heat exchanger connected to the mixing container so as to exchange heat between ambient air and the liquid mixture in the mixing container.”

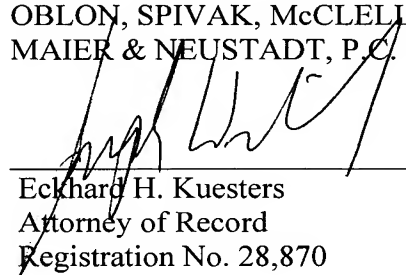
In view of the above-noted distinctions, Applicants respectfully submit that Claim 8 (and any claims dependent thereon) patentably distinguish over Von Andrian.

Claim 16 recites “a heat exchanger exposed to ambient air” and “a circulation unit circulating the liquid mixture between the mixing container and the heat exchanger so as to exchange heat between the ambient air and the liquid mixture.” Applicants respectfully submit that Claim 16 (and any claims dependent thereon) patentably distinguish over Von Andrian for reasons similar to those provided for Claim 8.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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